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LIII.—*A Month on the Trondhjem Fiord.* By the Rev.
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[Plate XVI.]

I HAD already spent four summer holidays in dredging on the Norwegian coast. In 1878 I went first to Oster Fiord, which is a little north of Bergen, and along the lovely sides of which the admirably engineered railway from Bergen to Voss now passes through endless cuttings and tunnels; then I took up my quarters on Bukken, an islet in the Bergen Fiord, and subsequently had a week's work at Dröbak, on the Christiania Fiord. In 1879 I went to the Hardanger Fiord, staying at Lervig, on the island of Stordö. In 1882 I determined to visit Florö, a district made classic by the admirable work done there fifty years ago by Professor M. Sars, at that time Minister of Florö. While there I received an urgent request from Prof. E. Ray Lankester to come to Lervig and help him to find *Rhabdopleura*, which I had taken there in 1879. I therefore left Florö and joined him at Lervig. In 1890 I spent two months in East Finmark or Lapland, dredging first from Vadsö, on the Varanger Fiord, and subsequently working the Sydvaranger Fiords from Kirchenes, which is close on the Russian frontier. It had been my purpose this past summer to have gone southwards, but my doctor ordered me north. This being the case, I selected the Trondhjem Fiord as the place for my researches. I was led to this

decision first on account of the richness of the locality in Actinozoa, as proved by the work of Herr Storm, and secondly and more particularly because Prof. G. O. Sars had found so many new and rare Amphipoda in its waters.

Trondhjem, or Drontheim, as it is commonly spelt in England, is in about lat. $63^{\circ} 25'$, or some $1^{\circ} 50'$ south of the Arctic Circle. The fiord is very tortuous, first, near its entrance, running nearly south, then west, and ultimately making its way N. by E. for a great distance in a direction nearly parallel with that of the coast. Taking into account the varied windings it probably is as long, or nearly so, as the two great Sogne and Hardanger Fiords, and the square miles of water which it embraces must, I think, be fully equal to that of either of the two fiords named.

I took with me as assistant Mr. Andrew Scott, son of Mr. Thomas Scott, of the Scotch Fishery Board. The working apparatus consisted of three dredges of different sizes, a small trawl, towing-net, hand-nets, 600 fathoms of rope and 200 fathoms of whale-line, a hand-winch (without which dredging in 200–300 fathoms is, of course, out of the question), sieves, &c., and cases of jars and bottles of various sizes. As my chief object was to obtain small species, the nets of the dredges were made either of cheese-cloth or old coffee-bags. These rapidly filled and brought up all the finest mud. A consequence of this was that while these nets admirably served my special purpose, they did not sweep over the ground in the way that nets with a large mesh which let the mud pass through would have done; and thus, while I was amply rewarded by the small forms obtained, I did not procure the same, or anything like the same, number of large Echinoderms &c. which might have been secured in the same time had another mode of collecting been employed.

A rather small boat with lugger sail was hired at Trondhjem, a considerably larger one, but similarly rigged, at Rödberg. Three or four men and ourselves were the boats' complement of hands.

I spent the first fortnight at Trondhjem and a fortnight and a few days at Rödberg.

Trondhjem was not found to be very rich. The best shallow-water ground seemed to be that between the land and the islet of Munkholmen. The English Channel Fleet, however, was lying at anchor in this part during most of the time I was there, and this somewhat interfered with working this ground. To the east of this the river Nid flows into the fiord with a very strong current and large volume of water, and while the former is not helpful to

dredging, the latter seems to make the ground comparatively unproductive. Between Munkholmen and the western shore of the bay there is deep water, 100–150 fathoms; but at the head of this part of the bay is an extensive saw-mill, and hence, even at the greatest depths, a large amount of sawdust was found, which is not favourable to animal life. The best ground I met with from Trondhjem was out in the fiord beyond Munkholmen, and here in 150 fathoms was a rich fauna. The weather was more or less stormy while we were at Trondhjem, and we were only able to dredge one day so far from land.

Rödberg is about 15 miles from Trondhjem towards the mouth of the fiord, and the dredging-ground here is remarkable in many ways and peculiarly typical of what Norwegian fiords are. The fiord is at this point considerably contracted in breadth, and through this narrow channel the whole tidal waters must pass. This causes a very strong current; but the surface-current, curious to say, is always, both at ebb and flood tide, in the same direction, *outwards*, except that when a strong wind comes into the fiord this would seem sometimes to alter its course. I could get no explanation of the tidal currents from the inhabitants; but it is obvious that during flood tide if the upper water is flowing outwards there must be a very powerful under-current flowing inwards, and this was clearly evidenced when dredging, and made it most difficult to hit the ground which it was desired to reach. Of course the paying out of 500 or 600 fathoms of line takes a considerable time, and what with current one way and wind another, when the strain of dredging came upon the rope it was often discovered that we were very far from where we intended to be and were dragging the dredge in an opposite direction to that desired. Thus much will suffice to show that it is not an easy place to work.

But if not easily worked it is none the less very rich ground. From the causes I have mentioned it is extremely difficult to know the exact depth to which the dredge has been down, and the depths given in this report which follows must be received with some amount of reserve. Charts are of little use, as comparatively few soundings have been taken. It is easy enough on the British coast to have charts with very numerous soundings, since the depths are merely a few fathoms. It is quite a different question on the vast Norwegian coast, where soundings in the fiords range from 100 to 600 fathoms. Moreover it is not, of course, necessary for purposes of navigation to accurately survey depths which are known to exist and to be too great either for danger or for anchorage. The

soundings given of the bottom of the fiord for a few miles round Rödberg all range from 250 to 280 fathoms, while the fishermen state that at certain spots 300 fathoms are exceeded. I have therefore when intimating the bed of the fiord given it as "250-300 fathoms."

The Bottom of the Fiords.

The bottom is a very fine greyish mud. With the exception of Echinodermata (more especially Asteroidea), Actinozoa of the families Virgulariadae and Pennatulidae, and the giant *Lima excavata* (which, however, more usually is found attached to the precipices), the animals which inhabit this mud are for the most part of small size. The Mollusca are almost all white or pale in colour or olivaceous green; as typical species in that depth the following are given:—

Scaphander punctostriatus.	Dentalium agile.
Cylichna alba.	Pulsellum quinquangulare.
Diaphana globosa.	Cadulus subfusiformis.
Bela Trevelyana.	*—— propinquus.
*—— tenuistriata.	Lima excavata.
Spirotropis carinata.	Pecten imbrifer.
Typhlomangelia nivalis.	*Dacrydium vitreum.
Taranis cirrata.	Nucula tenuis.
*Metzgeria alba.	—— tumidula.
Trophon barvicensis.	*Portlandia acuminata.
—— clavatus.	—— lucida.
S. Siphon ebur †.	—— tenuis.
Ukko Turtoni.	—— frigida.
Lovenella metula.	Malletia obtusa.
Læocochlis Macandreeæ.	*Limopsis minuta.
Cerethiopsis costulata.	Cardium minimum.
S. Torellia vestita.	Cryptodon flexuosus.
Alvania Jeffreysii.	—— crolinensis.
—— cimicoides.	*—— eumyrius.
—— subsoluta.	—— ferruginosus.
Aclis exigua.	Kelliella miliaris.
*—— Walleri.	Abra longicallus.
Eulima stenostoma.	—— nitida.
—— intermedia.	*Lyonsiella abyssicola.
Eulimella scillæ.	Poromya granulata.
Cyclostrema, species.	Cuspidaria rostrata.
Scissurella crispata.	—— obesa.
Neomenia cainata.	*—— lamellosa.
Chætoderma nitidulum.	—— abbreviata.
Dentalium striolatum.	Saxicavella plicata.

* Species with an asterisk were not found by me in the Trondhjem Fiord, yet are typical of the bottom of other West-Norway fiords.

† Species to which S. is prefixed were not found by me at Rödberg, but very fine examples of them from that locality have been collected by Herr Storm and are in the Trondhjem Museum.

The Crustacea of the Norwegian fiords possess a peculiar interest when compared with British and Arctic species. As we go further and further north the Brachyura and Anomura gradually decrease in number, and species after species drops out. To make up for their absence there is a much larger development of Cumacea, Mysidea, and Amphipoda on the Norwegian coast, while in the true arctic seas the Amphipoda attain their maximum development—not, as far as yet known, perhaps in number of species, but in size and multitude of specimens. The following list will give evidence of this gradual suppression of Brachyura and Anomura:—

	Brachyura.	Anomura†.
Mediterranean *	79	23
Britain	49	15
Norway.....	24	9
Greenland, Spitsbergen, and Kara Sea..	3	2

Of the three Arctic Brachyura the great *Chionæcetes phalangium* is a truly arctic form, circumpolar in its distribution. It often measures $2\frac{1}{2}$ feet in stretch of legs. It rarely occurs outside the Arctic Circle, but on the American coast has been found as far south as Casco Bay (*S. I. Smith*). On the coast of Europe it is unknown. *Hyas araneus* and *correctatus* grow to an immense size in Greenland, but occur southwards to the south coast of England in greatly dwarfed dimensions. The two Anomura, *Lithodes arctica* and *Eupagurus pubescens*, also reach England. If we deduct these four species it is very remarkable that of the remaining twenty-nine species of Norwegian Brachyura and Anomura there is only one, and that of very small size, *Eupagurus chiroacanthus*, Lillj., which is not as yet known in the Mediterranean. Corresponding to the decrease in the number of higher Crustacea as we go northwards is the similar falling off in numbers as we descend to greater depths in the sea †. Macrura, on the other hand, are not unequally distributed, but seem to occur in no great disparity of numbers in arctic, temperate, and warmer waters and in the great depths of the ocean.

The most marked peculiarity of the Norwegian fiords with respect to the class Crustacea is the abundance of Mysidea and Cumacea. In the month on the Trondhjem Fiord I obtained more specimens of this tribe than I have found

* I have not counted a great many doubtful species recorded from the Mediterranean in Carus, 'Faunæ Medit. Prodrômus.'

† I have not here included the family Galatheidæ in the Anomura. No species of that family is found in the Arctic regions.

‡ See Norman, "Presidential Address," Trans. Nat. Hist. Soc. and Tyne. Nat. Field Club, vol. viii. (1883), p. 108.

in our own seas during thirty to forty years. Having given a list of typical Mollusca of the bed of the fiords, I now add one of some typical animals of other classes.

CRUSTACEA.

Calocaris Macandreae.	Harpinia pectinata.
*Pontophilus norvegicus.	— truncata.
*Nika edulis.	— crenulata.
Bythocaris simplicirostris.	— lævis.
*Pandalus propinquus.	*— abyssi.
Pasiphaea tarda.	Ampelisca odontoplax.
Boreomysis tridens and other species.	— pusilla.
Pseudomma,)	Haploops setosa.
*Amblyops,) species.	*Andania abyssi.
Erythroops,)	Astyra abyssi.
Parerythroops,)	Gitana rostrata.
Mysideis insignis.	Ediceropsis brevicornis.
Hemimysis abyssicola.	Halimedon acutifrons.
*Cyclaspis longicaudata.	Bathymedon longimanus.
Eudorella bispida.	Laphystiopsis planifrons.
Diastylis lucifer.	Bruzelia typica.
— echinatus.	*— tuberculata.
— cornutus.	Nicippe tumida.
— tumidus.	Halice abyssi.
— serratus.	Pardalisca abyssi.
Campylaspis horrida and other species.	— tenuipes.
Apseudes spinosus.	Eusirus propinquus.
Paranthura tenuis.	— leptocarpus.
Æga ventrosa.	Laothoe Meinerti.
Ischnosoma bispinosum.	Leptamphopus longimanus.
Macrostylis spinifera.	Eriopisa elongata.
Munnopsidæ, many genera and species.	Cypridina norvegica.
Haplonyx cæculus.	Philomedes Lilljeborgii.
Leptophoxus falcatus.	Conchoecia borealis.
	Macrocypris minna.
	— angusta.
	Euchæta norvegica.

GEPHYREA.

S. Sipunculus priapuloides.	Ochnesoma Steenstrupii.
Phascosoma squamatum.	*— Sarsii.
*Tylosoma Lütkeni.	

ECHINODERMATA.

Rhizoerinus lofotensis.	Ophioscolex glacialis.
Antedon dentatus.	— purpureus.
Ophioglypha Sarsii.	Asteronyx Loveni.
— gracilis.	S. Pontaster tenuispinus.
— carnea.	S. Plutonaster Pælii.
Amphiura borealis.	S. Leptophycaster arcticus †.
Amphilepis norvegica.	Psilaster andromeda.
Ophiacantha, species.	Pentagonaster granularis.

† This species has not, I think, been found to the south of the Trondhjem Fiord.

Lasiaster hispidus.	Echinus acutus.
S. Lophaster furcifer.	— elegans.
Pteraster militaris.	* — norvegicus.
S. — pulvillus.	Schizaster fragilis.
S. Retaster multipes.	Holothuria tremula.
S. Bisinga endecacnemos.	Echinocucumis hispida.
S. — coronata.	Myriotrochus brevis.

ACTINOZOA.

Many fine Pennatulids and Virgularians.

SPONGOZOA.

Craniella cranium.	*Trichostemma hemisphæricum.
Thenea muricata.	Cladorhiza abyssicola.
*Cydonium Normani.	* — pennatula.
*Synops Macandrei.	Stylocordyla longissima.
*Isops phlegraei.	— borealis.

The mud is of a wholly different character from that of the Atlantic. It contains a large amount of mineral matter, while the shells of *Globigerina* and *Orbulina* are rarely represented. The Foraminifera are chiefly characterized by a large development of arenaceous forms, including many very interesting species, and by the large proportion of shells which belong to the Bulimine allies.

The Precipices.

The chief interest in the dredging of the Norwegian fiords centres in the work on the precipices. These often descend almost or quite perpendicularly from close to the shore to the bottom of the abyss. At Rödberg the whole of the western shore seems thus to sweep down into the fiord; but as I did little dredging on that side of the fiord, I shall speak only of that part of the eastern shore which is close to Rödberg itself. Here, according to my observations, there are three chief precipices. The first of these lies to the south and does not descend immediately from low-water mark, but runs out obliquely in a south-westerly direction from a little outside the end of the pier, the precipice thus facing N.E. In my first day's dredging I got upon this precipice most satisfactorily and brought up a dredge full of rare things, including the fine Aleyonarians *Paragorgia arborea*, *Paramuricea placomus*, *Briareum grandiflorum*, and *Duva rosea*, the corals *Lophohelia prolifera* and *Amphihelia ramea*, and the hydroid coral *Stylaster gemmascens*; together with various sponges, including *Geodia Barretti*, *Phakellia ventilabrum*, and *Tragosia infundibuliformis*; on and among these was a rich fauna, embracing *Gorgonoccephalus Lamarekii* and *Linckii*, *Ophio-*

glypha gracilis, *Ophioscolex glacialis*, *Echinus elegans* (very fine), *Spirotropis carinata*, *Trophon clathratus*, *Emarginula crassa*, *Hanleyia debilis*, *Pecten vitreus* and *aratus*, *Lima excavata*, &c. Although several attempts were made to again strike this exact spot, we never succeeded in doing so, and other parts of this precipice did not prove so rich.

The second precipice descends from a water-covered ridge which runs out in a west-by-south direction from the point of the little hill on the other side of the miniature bay which that hill forms to the north of Rödberg, the face of the precipice being thus E. by N. Here I met with some species which were not procured elsewhere, including the very rare and beautiful *Sarcophyton purpureum*.

The third precipice is at Rödberg itself, where from the northern ends of the rocks which form the little headland thus named a precipice of 250 fathoms descends perpendicularly to the bottom. This precipice was thus worked: the boat pulled out about two hundred yards, and when the dredge and sufficient rope had been let out returned to the shore; the dredge was then hauled up the face of this great 1500-foot submerged cliff. If it caught on a ledge or jutting point the rope was hauled very "taut," and then suddenly a few fathoms of line were slackened. In this way the dredge was frequently set free and hauled up again. When it finally caught, which was sure to be the case, the boat was again manned and the dredge was taken in from the sea. It was a wonderful sight to see the deep-sea Corals, Alcyonarians, Astrophytions, &c. in a dredge thus handled from the shore—containing a fauna of which we know nothing in our own shallow seas, and can only hope to meet with when we reach the great precipices which dive into the bed of the Atlantic far away to the west of Ireland.

The following list gives species which are characteristic of the precipices; many of them attach themselves to or crawl on the rock, but a considerable number feed upon or are almost invariably with or on the Alcyonarians or corals, into the latter of which some very interesting sponges also burrow.

MOLLUSCA.

<i>Aldisa zetlandica</i> .	<i>Calliostoma occidentale</i> .
<i>Triopella incisa</i> .	<i>Emarginula crassa</i> .
<i>Trophon clathratus</i> .	<i>Puncturella noachina</i> .
— —, var. <i>Gunneri</i> .	<i>Hanleyia debilis</i> .
<i>Spirotropis carinata</i> .	S. — <i>abysserum</i> †.
<i>Cerethiopsis costulata</i> .	<i>Leptochiton alveolus</i> .

† Magnificent specimens are in the Trondhjem Museum from Rödberg, but I did not meet with it.

Trachydermon exaratus.
 Pecten vitreus.
 — —, var. abyssorum.
 — aratus.
 — similis.

Lima excavata.
 Modiola phaseolina.
 Arca pectunculoides.
 — nodulosa.

CRUSTACEA.

Galathodes tridentatus.
 Spirontocaris polaris.
 — securifrons.
 Cryptocheles pygmæa.
 Caridion Gordonii.
 Parerythrops abyssicola.
 Pseudomma roseum.
 Mysideis insignis.

Stegocephalus inflatus.
 — similis.
 Andania abyssii.
 Stenothoe megacheir.
 Paramphithoe pulchella.
 Stenopleustes nodifer.
 Epimeria cornigera.
 — tuberculata.

ECHINODERMATA.

Ophiacantha spectabilis.
 — abyssicola.
 — anomala.
 Ophiocolex glacialis.
 Ophiactis Ballii.
 Ophiopholis aculeata, varieties.

Gorgonocephalus Lamarekii.
 — Linckii.
 Echinus elegans.
 — acutus.
 Psolus squamatus.

POLYZOA.

Caberea Ellisia.
 Bicellaria Alderi.
 Menipea Jeffreysii.
 Flustra Barleei.
 Tessarodoma gracile.

Hornera lichenoides.
 — violacea.
 Idmonea atlantica.
 Rhabdopleura Normani.
 (And many incrusting species.)

CŒLEENTERATA.

Duva rosea.
 Sarcophyton purpureum.
 Briareum grandiflorum.
 Paragorgia arborea.
 *Primnoa lepadifera.
 *Paramuricea placomus.
 Lophohelia prolifera.
 Amphihelia ramea.

Stylaster gemmascens.
 S. Aliopora norvegica.
 Stegapoma plicatilis.
 Halicornaria integra.
 *Lytocarpia bicuspis.
 *Plumularia elegantula.
 * — gracillima.
 *Heteropyxis norvegica.

SPONGOZOA.

Geodia Barretti.
 Tentorium tubiferum, *Œrsted*†,
 = Thecophora semisuberites,
O. Sch.
 *Quasillina brevis.
 *Alectona Milleri.

Phakellia ventilabrum.
 Trogosia infundibuliformis.
 Esperella lingua.
 *Desmacidon crux.
 *Rhaphidotheca Marshall-Hallii.
 (And many other Sponges.)

† I adopt this name, for I think there is no question that this is the sponge described as *Tethium tubiferum* by *Œrsted*, "Forteg. over Dyr samlede i Christianiafjord ved Drøbak" (Naturhist. Tidssk. Anden Rækkes, vol. i. 1845, p. 426 (or p. 29 separate copy), pl. v. figs. 3, 4, 6).

MOLLUSCA.

Admirable figures of all the northern Mollusca which do not occur on our own coasts will be found in G. O. Sars's 'Mollusca regionis Arcticæ Norvegicæ,' 1878.

CEPHALOPODA.

1. *Cctopus Bairdii*, G. O. Sars (? = *O. arcticus*, Prosch).

A small specimen taken in Trondhjem Bay.

GASTROPODA.

2. *Limacina retroversa*, Fleming (= *Spirialis retroversa*, G. O. Sars).

Two small specimens among dredged material at Rödberg.

3. *Actæon tornatilis*, Linn.

Rödberg, one dead specimen.

4. *Tornatina nitidula*, Lovén (= *Utriculus nitidulus*, G. O. Sars).

40–70 fath., Rödberg.

5. *Cylichna alba*, Brown.

Trondhjem and Rödberg, in 40–300 fath.

6. *Scaphander lignarius*, Linn.

Trondhjem.

7. *Scaphander puncto-striatus*, Migh.

Rödberg, 250–300 fath.

8. *Acera bullata*, Müller.

Rödberg, 5–10 fath.

9. *Philine scabra*, Müll.

One living, Rödberg.

10. *Philine Loveni*, Malm.

One living specimen, 70–100 fath., Rödberg.

11. *Aldisa zetlandica*, A. & H.

One specimen, 200–250 fath., Rödberg.

12. *Caldina repanda*, A. & H., = *Doris obvelata*, G. O. Sars.

Laminarian zone, Trondhjem.

13. *Triopella incisa*, M. Sars.

A specimen taken at Rödberg in 250–300 fath., easily recognized by Sars's admirable figures.

14. *Alderia modesta*, Lovén, Alder and Hancock, Mon. Nudib. Moll. pl. xli. ; Forbes and Hanley, pl. CCC. fig. 1.

Mr. Scott found a specimen of *Alderia* in a shallow pool into which the sea only broke at spring tides. This pool was in the little indentation of the coast just north of Rödberg.

It does not occur in Sars's list of Norwegian Mollusca, and has not, I believe, been previously met with in Norway. Alder and Hancock write: "The species extends to Norway, where it was discovered by Professor Lovén;" but this seems to be a mistake, for Lovén found it at Bohuslän, which is in Sweden. The distribution of the brackish-water fauna has a peculiar interest.

15. *Clathurella linearis*, Mont.

Shallow water, Trondhjem and Rödberg.

16. *Clathurella Leufroyi*, Mich.

One young, Trondhjem.

17. *Bela Trevelyana*, Turton.

Trondhjem and Rödberg, 70-100 fath.

18. *Bela rugulata*, Möll.

Rödberg, 10-20 fath.

Var. *bergensis*, Friele.

Rödberg, 70-100 fath.

19. *Bela decussata*, Couth., = *viridula*, Möll. (scarcely of G. O. Sars, which is *B. Kobelti*, Verk.).

A single specimen of var. *conoidea*, G. O. Sars, at Rödberg, in 250-300 fath.

20. *Bela cancellata*, Migh. (= *elegans*, Möll.), var. *declivis*, Lovén.

Rödberg, 70-200 fath.

21. *Spirotropis carinata*, Phil.

Rödberg, 250-300 fath.

22. *Typhlömangelia nivalis*, Lovén.

Two half-grown specimens, Trondhjem and Rödberg 150-300 fath.

23. *Thesbia nana*, Lovén.

Rödberg, 70-150 fath., three living specimens.

24. *Taranis cirrata*, Brugnone, = *Trophon Mörchi*, Malm.

Trondhjem, 150 fath. ; Rödberg, 250-300 fath.

25. *Admete viridula*, Fabr.

Rödberg, 10–70 fath.

Genus UKKO, Friele (new name for *Jumala*, Friele).

Herr Friele gave the name *Jumala* to this genus after that of an ancient Finnish god, unaware that *Jumala* was their word still in use for the one true God. My friend Herr Sparre Schneider, of Tromsö, having informed me that this was the case, and as under these circumstances the word could not with propriety be retained, I called Herr Friele's attention to the fact. At his request I substitute for it *Ukko*, the name once used among the Fins for the heathen god of wind and weather.

26. *Ukko Turtoni*, Bean.

A living specimen of a very interesting variety of this species was dredged at Rödberg in about 150 fath. In outline it is shorter and less drawn out in the spire than usual, the volutions are $7\frac{1}{2}$ and more tumid. The nucleus is smaller and less cylindrical than in the type, the suture less oblique, the whorls more rapidly increasing in breadth, the spiral striæ more regularly arranged at distinct intervals, the substance of the shell is thinner, the interior is of a purplish hue.

There are three modifications of this shell known to me:—

A. a. The typical Dogger-Bank form, with its greatly drawn-out spire, well figured by Forbes and Hanley, also by Jeffreys, and very nearly the same by G. O. Sars (pl. xiv. fig. 3*b*, and pl. xxv. fig. 9). The following are measurements of a specimen from the Dogger Bank*:—Length of mouth from commencement of lip to end of canal 54 millim.; spire from commencement of lip to end 72 millim.; greatest width of total shell at the mouth 40 millim. Volutions nine.

b. Var. *brevispira* (Pl. XVI. fig. 1; see also Kobelt, *Icon. der schalent. europ. Meeresconch.* pl. xiii. fig. 1). Form from East Finmark. Mouth proportionately longer and wider and the spire shorter, but in general character very like *a.* Length of mouth 49 millim., spire 45, breadth at mouth 41. Volutions $7\frac{1}{2}$. Here the length of the mouth is greater than that of the spire and the width at the mouth greater than in the much larger Dogger-Bank specimen. The four or five first volutions are very narrow, as in the type.

c. Var. *tumida* (Pl. XVI. fig. 2). The Rödberg specimen already described. The mouth in my specimen has unfortunately been much damaged, but its length is 45 millim.,

* This specimen is rather more elongated than usual.

length of remaining portion of spire 44 millim., breadth at mouth 36 millim. Here the proportions are not very different from those of the East-Finmark form, but the aspect is altogether different on account of the greater tumidity of the whorls and other characters. Sars's pl. xiv. fig. 3 *a* comes near to my specimen in characters of sculpture and tumidity of whorls, but it is more elongated in the spire. It may be regarded, however, as an illustration of the variety.

B. *Ukko Ossiani*, Friele, = *Jumala Ossiani*, Friele (Den Norske Nordhavs-Exped., Mollusca, I., 1882, p. 7, pl. i. figs. 1-6, pl. iv. figs. 1-3*).

The figure given supplies the following measurements:—Length of mouth 38 millim., of remaining portion of spire 40 millim., breadth at mouth 32 millim. This form comes suspiciously near to *U. Turtoni*, from which, among other points, it differs in the more regular formation of the earlier nuclear whorls, in which respect it agrees with *U. schantariæ*.

C. *Ukko schantariæ* (Middendorff). (Pl. XVI. fig. 3.)

1849. *Tritonium (Fusus) schantariæ*, Middendorff, Beit. zu einer Malacoz. Rossica (Mém. Sci. Nat. Acad. Imp. vol. vi.), pt. 2, p. 146.
1851. *Tritonium schantariæ*, Middendorff, Siberische Reise, vol. ii. p. 230, pl. x. figs. 7-9.

Some years ago I purchased a shell from the collection of the late Baron Prévost, which was said to come from Japan, which is beyond the range of my collections and studies; but this particular shell was purchased on account of its evident relation to arctic forms. The shell was in a paper tray, on which was the following account of it:—“*Fusus Sabini*, Gray, coquille recueillie dans le nord du Japon par M. A. Adams pendant le voyage du Samarang.” It clearly had nothing to do with *T. Sabini*. Jeffreys was just then writing something on Japanese shells, and I sent Prévost's *Fusus* to him for his opinion. He returned it with a label “*Fusus Turtoni*, not *T. Sabini*.” It might well be so, but I could not doubt that so marked a form had received a name; and so, while writing this paper, I sent it up to Mr. Edgar A. Smith to ask whether he could throw any light upon it. He replied that the shell was not in the British Museum, but that it was “*Tritonium schantariæ* of Middendorff, from Schantar Island, in the Okhotsk Sea.” On referring to Middendorff's

* Figure reproduced in Kobelt, Iconog. der schalentragenden europ. Meeresconch. pl. xii. fig. 2.

works it is evidently, I find, that species; the only difference is that in my specimen, as compared with Middendorff's fig. 9, the raised spiral portions of the shell are wider and the grooved lines narrower. As to the exact locality of my specimen, nothing can be satisfactorily determined.

The species is not mentioned in the voyage of the 'Samarang'; Schanter Island is certainly to the north of Japan, but whether Adams was ever there or not is uncertain; as surgeon of one of H.M. ships he may have gone there.

The shell must unquestionably be referred to the genus *Ukko*, and possibly may be, as Jeffreys considered, an extreme form of *U. Turtoni*; but its characters are so marked, and I lay chief stress on the spiral grooving of the inside of the lip, that it may well bear a specific name.

Whorls 9; total length 77 millim.; greatest breadth 33 millim.; length of mouth and canal 35 millim.; length from commencement of lip to end of spire 46 millim. Comparing these measurements with Middendorff's figure it will be found that the spire in my example is longer in proportion to the mouth than in the type. The whole appearance of form, amount of convexity of whorl, and obliquity of suture, together with surface sculpture, are like those of typical *U. Turtoni* in miniature. The differences are that the nucleus is not so cylindrical, each succeeding whorl being wider than the preceding; the epidermis is thinner and closely adherent to the shell; the shell is proportionately more solid, the spiral grooves are more deeply impressed, while the most important character is that the mouth within the shell is lirate with spiral grooves and ridges corresponding to the external sculpture—"apertura intus ad strias externas regulariter et parallele sulcata" (*Middendorff*). The operculum is imperfect, but enough remains to show that it is like that of the type of the genus.

27. *Neptunea antiqua*, Linn.

One dead example.

28. *Siphogracilis*, Da Costa, var. *glaber*, Verkrutzen. (Pl. XVI. figs. 4, 4 a.)

A dwarf and remarkable form of this variety was found. Volutions $6\frac{1}{2}$. Length 37 millim., breadth 19 millim.; length of mouth and canal 21 millim. Whorls only slightly convex, suture not deeply impressed and only a little oblique, no spiral sculpture to be seen even in the neighbourhood of the columella; epidermis of a pale greenish-ash hue.

This is the smallest form of this very variable species that I have, and of peculiar interest as being absolutely identical in size, form, and colour with a variety of the allied *S. propinquus*, Alder, found in the Kattegat, and for which I am indebted to the Copenhagen Museum. The different character of the nucleus alone distinguishes them; and, although the use of a lens reveals spiral striæ in the latter which are absent in the former, such striæ are usual in *S. gracilis* and are even to be distinguished on a young specimen of the present form.

The Kattegat variety of *S. propinquus* is intermediate in size and form between typical *S. propinquus* and *S. Jeffreysianus*, Fisher, which latter I regard as a large variety of the former. It is figured (Pl. XVI. figs. 5, 5a) for comparison with the dwarf form of *S. gracilis*, var. *glaber*.

29. *Buccinum undatum*, Linn.

Specimens procured not representing any special variety.

30. *Nassa reticulata*, Linn.

All the examples of this species which I have dredged on the west coast of Norway, in the Hardanger, Bergen, and Trondhjem Fiords, and at Florö, have a peculiar aspect and form a well-marked variety, which I would propose to call var. *norvegica*. The form is shorter and proportionately broader than usual, so that the outline is more ovate; the ribs are about twenty-five on the body-whorl, very close together, and, as the spiral grooves are deeply channelled, the sculpture is of a more regular reticulate character than usual; the colour is greenish ashy. Of the twenty-five figures of *N. reticulata* given by Kobelt on plate xxiv. of his *Icon. der schalentragenden europ. Meeresconchyl.* 1887, fig. 24 comes nearest to this form.

31. *Nassa incrassata*, Ström.

Laminarian zone.

32. *Trophon truncatus*, Ström.

One dead specimen, 40 fath., Rödberg.

33. *Trophon clathratus*, Linn.

In 70–300 fath., Rödberg.

Var. *Gunneri*, Lovén.

Two half-grown examples with the last.

34. *Trophon clavatus*, G. O. Sars.

Rödberg, 250–300 fathoms. Two living examples of this very rare shell were procured. They very closely accord with the two specimens figured by Sars in character and even in size, the one having a length of $15\frac{1}{2}$ millim., the other 11 millim.; of these total lengths, in the first the mouth and its very long canal occupy $7\frac{1}{2}$ millim., in the latter 6 millim.; on the larger five varices are visible on the body-whorl when viewed from the front, on the smaller six. The varices are projected considerably on the upper part of the volutions in triangular processes outwards, but *scarcely* at all upwards. It appears to me quite distinct from *M. clathratus*, and is also wholly different from *M. vaginatus*, Christ. and Jan, of the Mediterranean.

35. *Trophon barvicensis*, Johnston.

Specimens small, in 150–300 fath.

36. *Trivia europæa*, Mont.

10 fath.

37. *Aporrhais pes-pelecani*, Linn.

Trondhjem, 10–30 fath.

38. *Bittium reticulatum*, Da Costa.

Laminarian zone.

39. *Lovenella metula*, Lovén.

Rödberg and Trondhjem, 150–300 fath.

40. *Læocochlis Macandreae*, H. Ad.

Rödberg, 250–300 fath.

41. *Cerethiopsis costulata*, Möll.

Rödberg and Trondhjem, 150–300 fath.

42. *Trichotropis borealis*, Brod. & Sow.

Trondhjem and Rödberg, 5–30 fath.

43–45. *Littorina littorea*, Linn., *L. rudis*, Maton, and *L. obtusata*, Linn.

The last typical and not showing any approach to *L. palliata*. I have not seen the latter from south of Tromsö. Specimens taken at the Lofoten Islands in 1890 were the former; nor has G. O. Sars met with *L. palliata* at those islands.

46. *Lacuna divaricata*, Fabr.
Large at Rödberg, Laminarian zone.
47. *Skenea planorbis*, Fabr.
Rödberg, among weeds.
48. *Rissoa inconspicua*, Alder, var. *albella*, Lovén.
Laminarian zone, Rödberg.
49. *Rissoa parva*, Da Costa, var. *interrupta*, Adams.
Laminarian zone, Trondhjem.
50. *Alvania Jeffreysi*, Waller.
Trondhjem and Rödberg, 150-300 fath.
51. *Alvania cimicoides*, Forbes.
Trondhjem and Rödberg, 150-300 fathoms.
52. *Alvania subsoluta*, Aradas, = *Alvania abyssicola*, G. O. Sars, typus (Forbes and Hanley, varietas).

250-300 fath., off Rödberg. As it appears to me that Jeffreys has introduced great confusion respecting the synonymy of this shell, it will be well to attempt to clear the matter up. This confusion commenced in his paper on Mediterranean Mollusca in the 'Annals' of 1870, and was made worse by his latest views, as expressed in his "Mollusca of the 'Lightning' and 'Porcupine' Expeditions" (Proc. Zool. Soc. 1884, p. 115).

I will give the synonymy of the species as I now take it to be, a list of the specimens in my collection on which my conclusions are based, and some notes on the reasons of those conclusions.

1. *Alvania Testæ* (Aradas and Maggiore).

1844. *Rissoa Testæ*, Ara. & Magg. Cat. rag. Catania, pl. ix. fig. 4.
1870. *Rissoa abyssicola*, var. *conformis*, Jeffreys, "Mediterranean Mollusca," Ann. & Mag. Nat. Hist. ser. 4, vol. v.
1880. *Rissoa Testæ*, Monterosato, Bull. Soc. Malac. Ital. vol. vi. p. 68.
1884. *Rissoa Fischeri*, Jeffreys, Proc. Zool. Soc. p. 113, pl. ix. fig. 1.
1884. *Rissoa Testæ* (partim), id. ibid. p. 115, pl. ix. fig. 4.
1884. *Actonia Testæ*, Monterosato, Nomencl. gen. e spec. di alcune Conchiglie Medit. p. 61.

Hab. Mediterranean (not North European).

I am indebted to the Marchese di Monterosato for ten specimens labelled "*Alvania Testæ* = *conformis*, Palermo." These, from their more numerous ribs and the peculiar shouldering (above and below) of the volutions, agree more closely with Jeffreys's figures of *R. Fischeri* than with those he gives

of *R. Testæ*. The lip is considerably thickened, and sculptured externally with many fine longitudinal striæ. I think that there can be little doubt that these two forms are one species. It is possible also that *R. subsoluta* is not *specifically* distinct from them.

2. *Alvania subsoluta* (Aradas).

1847. *Rissoa subsoluta*, Aradas, Mem. di Malac. Sic. vol. iii. p. 21.
 1853. *Rissoa abyssicola*, Forbes & Hanley, Hist. Brit. Moll. vol. iii. p. 86, pl. lxxvii. figs. 1, 2, and pl. JJ. fig. 3 (varietatis *abyssicola* figura bona).
 1867. *Rissoa abyssicola*, Jeffreys, Brit. Conch. vol. iii. p. 19, pl. lxvi. fig. 9 (figura mala).
 1878. *Alvania abyssicola*, G. O. Sars, Moll. reg. arc. Norv. p. 177, pl. x. fig. 7, a-c (formæ typicæ optimæ figuræ).
 1870. *Rissoa abyssicola*, var. *obtusa*, Jeffreys, "Mediterranean Mollusca," Ann. & Mag. Nat. Hist. ser. 4, vol. vi. p. 12 (separate copy).
 1875. *Rissoa elegantissima* and *subsoluta*, Monterosato, Nuova Revista delle Conch. Medit. p. 17.
 1884. *Rissoa subsoluta* and *R. Testæ*, var. *abyssicola*, Jeffreys, Proc. Zool. Soc. p. 115, pl. ix. fig. 3.
 ? 1884. *Rissoa deliciosa*, id. ibid. p. 121, pl. ix. fig. 7.
 1884. *Actonia subsoluta*, Monterosato, Nomen. gen. e spec. di alcune Conch. Medit. p. 61.

Specimens in my collection are as follows:—

- a. "*Alvania elegantissima*, Palermo" *, from Marchese di Monterosato.—Three specimens.
- b. "*Actonia subsoluta*=*deliciosa*, Palermo," from Monterosato.—Four specimens.
- c. "*Rissoa subsoluta*, Aradas, Palermo, very deep," from Monterosato.—Two specimens.
- d. Off Batalden, near Florö, Norway, 200 fath.—Two specimens, A. M. N.
- e. Oster Fiord, near Bergen, 375 fath.—Five specimens, A. M. N.
- f. Off Lervig, Hardanger Fiord, 200 fath.—Five specimens, A. M. N.
- g. Rödberg, Trondhjem Fiord, 250–300 fath.—Twelve specimens, A. M. N.
- h. Loch Fyne.—Five specimens, Mr. MacAndrew.
- i. The Kattegat.—Five specimens from the Copenhagen Museum.

a and b (received at different dates) are identical and rather

* Monterosato subsequently united his *A. elegantissima* with *A. subsoluta*.

narrower in form than the next. *c*: these specimens are absolutely identical with those of *d*, and are the form figured by Jeffreys, 1884, fig. 3, except that the spiral riblets are on all parts of the whorls; *c* and *d* have not the labial rib so well developed, as is admirably figured by Sars (fig. 5 *c*), with whose figures *e*, *f*, and *g* exactly correspond. *h* are some of the original specimens of the form dredged by Forbes and MacAndrew and figured in the 'British Mollusca;' they differ from Norwegian and Mediterranean specimens, as Forbes and Hanley's figure shows, in the more conical outline, much less swollen and almost flat volutions, and less expanded mouth. The Norwegian form I therefore consider should be called *Alvania subsoluta*, Ar., and the Loch-Fyne form *Alvania subsoluta*, Ar., var. *abyssicola*, Forbes.

The Kattegat examples are interesting, intermediate between the British and Norwegian forms, though perhaps nearer to the former.

The particular specimen of *A. subsoluta* figured by Jeffreys (1884, fig. 3) is represented as having spiral riblets only on the lower half of the whorls. One of my Trondhjem-Fiord examples has no spiral riblets except on the last whorl, and another has the upper whorls without riblets, while on the penultimate whorl they are, as in Jeffreys's figure, confined to the lower half.

53. *Onoba striata*, Adams.

A few specimens of the typical form.

54. *Velutina levigata*, Penn.

Trondhjem and Rödberg.

55. *Lamellaria latens*, Müller.

Rödberg, 40-70 fath., one specimen.

56. *Lunatia grænlandica*, Beck.

Two or three small specimens, 150 fath., Rödberg.

57. *Lunatia Montagui*, Forbes.

Shallow water, Trondhjem and Rödberg.

58. *Scalaria grænlandica*, Perry.

Only one specimen, Rödberg, about 20 fath.

59. *Aclis exigua*, G. O. Sars.

One living specimen, 250-300 fath., Rödberg.

60. *Eulima intermedia*, Cantr.

Rödberg and Trondhjem, down to 300 fath.

61. *Eulima bilineata*, Alder.
A few specimens.
62. *Eulima stenostoma*, Jeffr.
Trondhjem and Rödberg, 150–300 fath.
63. *Parthenia spiralis*, Mont.
A few living specimens.
64. *Turbonilla rufa*, Phil., var. *rufocincta*, Thomp.
A single living specimen, Trondhjem.
65. *Odostomia unidentata*, Mont.
Rödberg, in the Laminarian zone.
66. *Auriculina insculpta*, Mont.
Rödberg, 250–300 fath.
67. *Eulimella ventricosa*, Forbes.
One living specimen, Rödberg.
68. *Eulimella scillæ*, Scac.
Trondhjem and Rödberg, 40–300 fath.
69. *Cyclostrema Petterseni*, Friele, = *C. trochoides*, Jeffreys.
Rödberg, 250–300 fath.
70. *Cyclostrema lævigatum*, Jeffreys.
Rödberg, 70–100 fath., two specimens.
71. *Cyclostrema basistriatum*, Jeffreys.
Rödberg, 250–300 fath.
72. *Calliostoma millegranum*, Phil.
3–20 fath., Rödberg.
73. *Calliostoma occidentale*, Migh.
Rödberg, 150 fath.
74. *Gibbula cineraria*, Linn.
Rödberg, Laminarian zone.
75. *Margarita helicina*, Fabr.
Trondhjem and Rödberg, 0–10 fath.
76. *Margarita grænlandica*, Chemn.
At Rödberg, with the last.
77. *Scissurella crispata*, d'Orb.
Large specimens, Rödberg, 250–300 fath. *Scissurella*

attains a much larger size in the Norwegian fiords than in the British seas.

78. *Emarginula crassa*, Sow., and var. *depressa*, G. O. Sars.
Five specimens at Rödberg on the precipices, 100–250 fath.

79. *Puncturella noachina*, Linn.
Trondhjem and Rödberg, 5–200 fath.

80. *Pilidium fulvum*, Müll.
Trondhjem and Rödberg, 5–40 fath.

81. *Acmea virginea*, Müll.
Specimens small, Rödberg, 0–40 fath.

82. *Lepeta cæca*, Müll.
3–40 fath., Rödberg and Trondhjem.

83. *Patina pellucida*, Linn.
Rödberg, on Laminariæ.

84. *Patella vulgata*, Linn.

85. *Hanleyia debilis*, Gray, = *Chiton Hanleyi*, Bean.
100–250 fath., Rödberg and Trondhjem.

86. *Leptochiton alveolus*, M. Sars.
150–250 fath., Rödberg.

87. *Leptochiton cinereus*, Linn., = *C. asellus*, Chemn.
5–10 fath.

88. *Trachydermon ruber*, Linn.
Shallow water.

Var. *candidus*, Norman.

A very pretty variety occurred at Rödberg, of which I found three specimens, all exactly alike. Valves white, except a longitudinal central dorsal line of rose-colour on the fifth valve, and the girdle also rose-coloured.

89. *Trachydermon albus*, Linn.
Shallow water, Rödberg.

90. *Trachydermon exaratus*, G. O. Sars.
200–250 fath., Rödberg.

91. *Tonicella marmorea*, Fabr.
Shallow water, Trondhjem and Rödberg.

92. *Neomenia carinata*, Tulljberg, = *Solenopus nitidulus*,
M. Sars (MS.).
250–300 fath., Röddberg.
93. *Chaetoderma nitidulum*, Lovén, = *Chrystallophrisson*
nitens, Möbius.
250–300 fath., Röddberg.

SCAPHOPODA.

94. *Dentalium entalis*, Linn.
40–70 fath.
95. *Dentalium striolatum*, Stimpson, = *D. abyssorum*, M. Sars.
150–300 fath.
96. *Dentalium agile*, M. Sars.
Röddberg, 250–500 fath.
97. *Pulsellum affine*, M. Sars.
Abundant in one dredging, 250–300 fath., Röddberg.
98. *Pulsellum quinqueangulare*, Forbes, = *Siphonotalis tetra-*
gona, G. O. Sars.
150 fath., Trondhjem; 250–300 fath., Röddberg.
99. *Cadulus subfusiformis*, M. Sars.
Röddberg, 250–300 fath.

PELECYPODA.

100. *Anomia ephippium*, Linn.
Var. *aculeata*, Linn.
101. *Anomia striata*, Brocchi.
Röddberg, in about 150 fath.
102. *Pecten islandicus*, Müller.
Trondhjem, a small specimen.
103. *Pecten aratus*, Gmelin.
150–250 fath., Trondhjem and Röddberg.
104. *Pecten pes-lutræ*, Linn., var. *septemradiatus*, Müll.
Two or three small specimens, Röddberg and Trondhjem.
105. *Pecten vitreus*, Chemn.
150 fath., off Trondhjem; and 150–300 fath., Röddberg.

106. *Pecten striatus*, Müller.
Specimens large.
107. *Pecten tigrinus*, Müller.
Trondhjem and Rödberg.
108. *Pecten similis*, Laskey.
Trondhjem and Rödberg, down to 250 fath.
109. *Pecten imbrifer*, Lovén, =? *Pecten Hoskynsi*, Forbes.
Only one living specimen, 250-300 fath., Rödberg.
110. *Lima excavata*, Fabr.
This magnificent shell is far from rare in the fiord, and was taken both off Trondhjem and Rödberg in 150-300 fath., for the most part with the large corals and Aleyonarians on the precipices.
111. *Mytilus edulis*, Linn.
112. *Modiola modiolus*, Linn.
Trondhjem.
113. *Modiola phaseolina*, Phil.
Trondhjem and Rödberg.
114. *Modiolaria marmorata*, Forbes.
In *Ciona intestinalis* at Trondhjem.
115. *Modiolaria nigra*, Gray.
Rödberg, shallow water.
116. *Crenella decussata*, Mont.
250-300 fath., Rödberg.
117. *Arca pectunculoides*, Scacchi.
100-250 fath., Rödberg.
118. *Arca nodulosa*, Müller.
A single valve only, Trondhjem, in about 70 fath.
119. *Nucula nucleus*, Linn.
Only one, Trondhjem.
120. *Nucula nitida*, Sow.
Frequent down to 300 fath.
121. *Nucula tumidula*, Malm.
100-300 fath., Trondhjem and Rödberg.

122. *Leda minuta*, Müller.

Frequent.

123. *Leda pernula*, Müller.

Only one specimen, Röddberg.

124. *Malletia obtusa*, M. Sars.

A fine series of living specimens of this rare shell taken at Röddberg, 250–300 fath.; also off Trondhjem in 150 fath.

125. *Portlandia lucida*, Lovén.

Trondhjem, 150 fath.; Röddberg, 70–300 fath.

126. *Portlandia tenuis*, Phil.

Trondhjem, one specimen only, 150 fath.

127. *Portlandia frigida*, Torell.

Röddberg, 250–300 fath., specimens large. This species attains larger dimensions on the west coast than in East Finmark.

128. *Astarte sulcata*, Da Costa.

Shallow water.

129. *Astarte compressa*, Linn., = *A. elliptica*, Brown.

The Scandinavian naturalists seem agreed that this is Linné's species, and not the next, which is usually called by this name by British conchologists.

130. *Astarte Montagui*, Dillwyn, = *A. compressa*, Montagu.

Shallow water, Trondhjem and Röddberg.

131. *Kelliella miliaris*, Phil.

Abundant in 150–300 fath. in the Trondhjem Fiord, as I have also found it to be at the bottom of the Bergen and Hardanger Fiords, as well as at Florö.

132. *Montacuta substriata*, Mont.

On *Spatangus purpureus*, Trondhjem.

133. *Montacuta ovalis*, G. O. Sars, = *Tellemya ovalis*, G. O. Sars.

A single perfect but dead shell in 250–300 fath., Röddberg. It has only previously been recorded from Lofoten, where it was taken by the describer, unless it be a synonym of *Decipula ovata*, Jeffreys, as stated by him to be the case (*vide* Proc. Zool. Soc. 1881, p. 696). If that be so, and Sars's shell has such a hinge as is described by Jeffreys, my

determination is wrong, since the hinge in my shell closely corresponds with that of *Montacuta ferruginosa* and with Sars's description. Unfortunately the specimen I had of *Decipula ovata* from the Oster Fiord, identified by Jeffreys, has been broken and lost (Norman, Journ. of Conch. vol. ii. 1879, p. 42).

134. *Montacuta bidentata*, Mont.
Rödberg, 0-10 fath.
135. *Cryptodon ferruginosus*, Forbes.
70-100 fathoms.
136. *Cryptodon croulinensis*, Jeffr.
100-300 fath., Trondhjem and Rödberg.
137. *Cryptodon flexuosus*, Mont.
Down to 300 fath.
138. *Cryptodon Sarsii*, Phil.
With the last.
139. *Lucina borealis*, Linn.
Trondhjem, specimens small.
140. *Cardium echinatum*, Linn.
Trondhjem.
141. *Cardium edule*, Linn.
Trondhjem, tide-marks.
142. *Cardium fasciatum*, Mont.
Trondhjem and Rödberg.
143. *Cardium minimum*, Phil.
Trondhjem and Rödberg, 70-300 fath.
144. *Cyprina islandica*, Linn.
Trondhjem.
145. *Venus gallina*, Linn.
A single valve, Trondhjem.
146. *Venus ovata*, Pennant.
Trondhjem and Rödberg.
147. *Dosinia lincta*, Pult.
Rödberg, shallow water.
148. *Psammodia ferroensis*, Chemn.
A single specimen, Trondhjem.

149. *Macoma calcarea*, Chemn.
Rödberg, 0-5 fath.
150. *Macoma balthica*, Linn.
Trondhjem.
151. *Abra longicallus*, Scacchi.
Trondhjem, 150 fath. ; Rödberg, 250-300 fath., rare.
152. *Abra nitida*, Müll.
Abundant, Trondhjem and Rödberg, 40-300 fath.
153. *Abra alba*, Wood.
Trondhjem, a single specimen.
154. *Poromya granulata*, Nyst.
Two specimens, 150 fath., off Trondhjem.
155. *Cuspidaria rostrata*, Speng.
Trondhjem and Rödberg, 70-300 fath.
156. *Cuspidaria obesa*, Lovén.
Rödberg, 150-300 fath.
157. *Cuspidaria costellata*, Desh.
Rödberg, 40-150 fath.
158. *Cuspidaria abbreviata*, Forbes.
Rödberg, 70-100 fath.
159. *Corbula gibba*, Olivi.
Only a small specimen or two seen.
160. *Saxicavella plicata*, Mont.
Trondhjem and Rödberg, 150-300 fath.
161. *Mya arenaria*, Linn.
Trondhjem, dead valves.
162. *Mya truncata*, Linn.
Trondhjem, on shore and dredged.
163. *Saxicava rugosa*, Linn.
Rödberg, down to 250 fath.
Var. *arctica*, Linn.
Unusually large examples of this variety at Rödberg on the precipices down to 200-250 fath.
164. *Solen pellucidus*, Penn.
Two or three small specimens.

165. *Xylophaga dorsalis*, Turton.

Wood dredged at Trondhjem which had been bored by this species.

[To be continued.]

EXPLANATION OF PLATE XVI.

- Fig. 1. *Ukko Turtoni*, var. *brevis*, Norman, nat. size.
 Fig. 2. *Ukko Turtoni*, var. *tumida*, Norman, nat. size; the lip much broken below.
 Fig. 3. *Ukko schantaricus*, Middendorff, nat. size; specimen from the North Pacific.
 Fig. 4. *Sipho gracilis*, var. *glaber*, Verkruzen, dwarf form, nat. size.
 Fig. 4 a. Apical whorls of the last, to show the rudely coiled nucleus.
 Fig. 5. *Sipho propinquus*, Alder, var. from the Kattegat, nat. size, to show its close approximation in form to fig. 4.
 Fig. 5 a. Apical whorls of the last, to show the regularly coiled nucleus.

I.IV.—On a new Genus of Heteromerous Coleoptera belonging to the Family Lagriidæ, from Tasmania. By G. C. CHAMPION, F.Z.S.

SIRRHAS, gen. nov.

Mentum small, strongly transverse, trapezoidal, almost smooth, flat, the maxillæ exposed at the base; mandibles bifid at the tip; labrum strongly transverse, prominent, separated from the epistoma by a coriaceous space; head rather large, moderately broad, exerted, very little narrowed behind, the epistoma very broad, short, depressed, and confounded with the front, the antennary orbits short and feebly raised, not projecting over the points of insertion of the antennæ; the eyes large, moderately prominent, widely separated, somewhat distant from the base of the head; apical joint of the maxillary palpi stout, triangular, the outer side rounded and a little longer than the inner or apical sides; antennæ very elongate, slender (the first joint excepted), joints 1 to 8 sparsely punctured, shining, 9 to 11 densely punctured, opaque, 2 to 8 cylindrical, each abruptly thickened at its distal end, 2 short, 3 exceedingly long, nearly four times as long as 2, 4 about half the length of 3, 4 to 11 subequal in length, 9 to 11 a little stouter than 8 and more gradually thickened, 11 subacuminate at the tip; prothorax transversely cordate, much wider than the head, expanded and sharply margined